An Evidence-Based Protocol to Improve Treatment Compliance and Decrease Time-to-Treat for Employees Exposed to Infectious Diseases

DNP Final Project

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by

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Abstract

Problem: Employees who are exposed to infectious diseases are not screened and treated in a timely manner. Barriers with screening and treatment protocols are concerning and need addressed.

Purpose: The purpose of this project was to create an evidence-based protocol to improve efficiency and treatment compliance among employees at a large, Midwestern medical center who have been exposed to infectious diseases during work hours. The intervention focused on changing the point-of-care from a central Employee Health location to on-site screening.

Methods: The literature search revealed that removing barriers and making it more convenient for employees to be screened and treated after an exposure event should improve overall compliance and screening rates. Having the Employee Health nurses conduct the screening on-site would remove a technical barrier presented when staff leaving their work area must report to a remotely located Employee Health unit for screening.

Findings: The pilot project was implemented following a large Meningitis exposure affecting over one hundred and five hospital staff members. Implementing on-site screening improved the overall compliance of health care workers seen within the optimal time frame. The percent of health care workers who were never screened decreased dramatically from 53% to 2%. Although there was a delay in initially identifying the presence of the disease causing the number of health care workers seen within the three day time frame to decrease (32% in 2016 compared to 17% in 2017), 94% of exposed employees were seen within three days of identification and within the recommended treatment timeline.

Recommendations: Changing the process from a centralized location to an on-site location was successful for this project. Screened employees provided overwhelmingly positive feedback about this new process.

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Section One: Nature of the Problem

Introduction to the Problem

According to the CDC (1998), health care personnel in or outside hospitals who have contact with patients, their body fluids or specimens have a higher risk of acquiring or transmitting infections than do other health care personnel who only have brief casual contact with patients and their environment. In health care organizations, employee safety is a main priority. Potential exposure to infectious diseases and pathogenic organisms presents a significant occupational hazard in the health care industry (Hood & Larranaga, 2007). As patients and hospitals become more complex, there is a greater risk of infectious diseases that could harm staff and patients. Hospitals must have policies and procedures in place to protect their staff from infectious diseases and prevent secondary exposure should an initial exposure occur.

Health care professionals, particularly nurses, are often exposed to microorganisms which can cause serious or even lethal infections (Efstathiou, Papastavrou, Raftopoulos & Merkouris, 2011). As one example in the U.S., invasive meningococcal disease has a high morbidity rate with 75,000 cases occurring annually resulting in 26,000 to 42,000 hospitalizations (Harrell & Hammes, 2012). Because exposure to meningitis can lead to serious complications for the healthcare provider and/or lead to secondary exposures, it is vital for hospital staff members to be seen as soon as an exposure is identified (Stuart et al., 2001).

Because of these risks, health care is now considered to be a high hazard and high risk industry for both patients and workers (The Joint Commission, 2012). Consequently, health care organizations are reshaping their screening and treatment protocols to protect their employees from contracting virulent infectious diseases. In most healthcare organizations, the Employee Health departments are responsible for updating protocols and policies pertaining to employee infectious

diseases. Elimination of structural and technical barriers for employees would improve access and allow the organization to better serve their employees (Dulmen, Sluijs, van Dijk, de Ridder, Heerdink & Bensing, 2007).

The Employee Health Department at my organization is responsible for ensuring that employees are protected from work-related illnesses and injuries. The department assists employees who are exposed to diseases and aid in their treatment. As the administrator of the Employee Health Department, I am concerned about current compliance with screening and treatment protocols when there has been an exposure to virulent infectious diseases. Table 1. below shows the past two years of data collected regarding select exposures in the organization. It is clear that this Medical Center has a significant number of exposure events.

Table 1.

Exposures of Employees to Select Virulent Infections Over Two Years

Infectious Disease	**2015 Exposure Events**	**2015 Employee Exposures**	**2016 Exposure Events**	**2016 Employee Exposures**
Tuberculosis	7	180	6	51
Neisseria Meningitis	4	220	4	110
Varicella	1	9	3	109
Total	**12**	**409**	**13**	**270**

Table 2. displays data related to three significant exposures that were examined for this project. Each exposure has a designated timeframe from the CDC for employees to be screened and potentially treated. As shown in Table 2, out of the 13 exposures events, only 44% of hospital staff members were seen in the optimal time frame. In addition, the majority (56%) of staff members were

screened outside of the optimal timeframe or were never screened at all. This information demonstrates that the current post-exposure protocol must be addressed to improve the safety of staff and patients. To address this problem, this project demonstrated the efficacy of an onsite screening location to improve compliance and make it more convenient for hospital staff members to be screened and potentially treated.

Table 2.

Select 2016 Exposure Events' Incidence and Employee Compliance within Timeframe Standard

Virulent Exposure and Optimal Post-Exposure Timeframe	**# of exposure events**	**# of HCWs reported on exposure list**	**# of HCWs seen within optimal time frame**	**# of people seen beyond optimal timeframe**	**# of people never screened**
Tuberculosis Exposure: 8-10 weeks	6	51	15 (29%)	24 (47%)	12 (24%)
Neisseria meningitis: 3 days	4	110	35 (32%)	17 (15%)	58 (53%)
Varicella: 8 days	3	109	68 (63%)	1 (<1%)	40 (37%)
Total	13	270	118 / 44%	42 / 15%	110 / 41%

Purpose of Project

The nature and scope of this project was to create an evidence-based protocol to improve treatment compliance as well as "time-to-treat" among employees exposed to select infectious diseases at a large, Midwestern medical center while providing care. To improve compliance and shorten the time-to-treat, the project focused on changing the point-of-care from central Employee

Health to on-site screening. During an exposure event, the Employee Health Department expanded their hours in order to screen staff from all three shifts.

For this project, three, select infectious diseases were chosen for examination: Tuberculosis (TB), Meningitis and Varicella (Tables 1 and 2). All three infectious diseases can have a significant impact on hospital staff members and patients if not treated right away. Since all three of these diseases are extremely infectious, it was important to improve processes that will impact time-to-treat and compliance. As Table 2 demonstrates, staff members who are exposed to TB, Meningitis and Varicella often are not screened in a timely manner or at all due to the structural constraints of location and timing of screening services.

Population of Interest and Potential Intervention(s)

The main population of interest primarily includes physicians, advanced practice providers, residents, medical students, nurses, patient care associates, respiratory therapists and housekeepers. The main intervention of this project involved deploying Employee Health nurses to the unit of exposed employees to screen them and initiate treatment, instead of requiring unit employees to report to central Employee Health.

Project Objectives

Outcomes expected of this project included more timely screening, improved screening and treatment compliance, and an improvement in employee satisfaction. A significant Meningitis exposure occurred during the project phase and the on-site delivery method was implemented. This process improvement of moving screening from a centralized location to on-site increased satisfaction and compliance among hospital staff members. With Employee Health's higher profile and interaction with unit employees, they were able to gain a better understanding of why it was vital to be seen and treated in a timely manner.

Section Two: Review of Literature

Clinical Practice Problem Statement

The clinical question to be addressed was "how can we improve time-to-treat and compliance rates post employee exposure?" The clinical area to be improved for this project was removal of barriers to being screened and treated during an exposure event of TB, Meningitis or Varicella. In the centralized method of screening, screening staff members exposed to TB, Meningitis and Varicella was often delayed. In previous exposures, hospital staff members reported that they were unable to travel to the Employee Health Department because the distance and travel time resulted in leaving their work unit for an extended period of time. Additionally, some hospital staff members were not seen at all because they never responded to the screening notification.

Evaluation / Summary of the Evidence from the Literature

The PICOT question for this project was **"**"In hospital staff members (**P**opulation) who have been exposed to select infectious diseases, does on-site screening and treatment (**I**ntervention) vs. centralized screening and treatment (**C**omparison) impact time-to-treat and compliance within the appropriate time frame (**T**ime)". Key words from the PICOT question were used to search CINAHL, PubMed and Cochrane databases. The search terms that were utilized in the databases were "Meningitis" and "protocol" (425 articles), "Meningitis" and "hospital worker" (9 articles) and "Meningitis" and" hospital acquired infections" (51) articles. In addition, "Varicella and protocol" (17) and "Varicella and hospital worker" were used (35). "Tuberculosis" and "protocol" (199) were also used. Furthermore, "occupational health services" and "health screenings" (555) were also utilized. Lastly occupational "health screenings" and "point-of-care testing" were utilized (6). After the initial search, another search was conducted and key search words were used to obtain additional information. Search terms were broadened to include "infectious diseases" and "on-site screening and treatment" (16). There were no time limits placed on the search. Information that was found ranged from 1978 to 2014. Upon further review, six articles were deemed relevant.

Evaluation / Summary of Evidence from Literature (Appendix A)

According to Bender et. al (2003), one of the best practices for screening individuals was to remove barriers to improve service by eliminating distractions, making the process easier and improving communication. An important first intervention is to simplify the process to help enhance compliance. Renaud et. al., (2008) conducted a randomized trial in the emergency department utilizing point-of-care testing to reduce time-to-treat. Point-of-care testing decreased the time to delivery of anti-ischemic therapy for ED patients with suspected acute coronary syndrome. In this project, point-of-care testing was instrumental in improving time-to-treat because of the ability to notify the physician in timelier manner.

Dulmen et. al. (2007) summarized findings from systematic reviews about removing treatment barriers to improve adherence. Dulmen et.al (2007) identified four types of effective adherence interventions: technical, behavioral, educational and multi-faceted or complex interventions. The most effective and relevant intervention for this project is technical intervention. Technical adherence interventions refers to simplifying the regimen (Dulmen et.al, 2007). The Employee Health Department will adjust their screening process by changing the location and hours of screening to better suit the constraints of staff.

After critically evaluating the evidence, there are several themes which could apply to this project. The first theme is to remove or address barriers that make it more difficult for staff to be screened and treated. Bender, Milgrom & Alpter (2003) and Dulmen et.al (2007) concluded that interventions targeted specifically to improve adherence were twice as effective as more broad interventions and therefore recommend interventions that are simple. By eliminating the barrier of asking staff to report to Employee Health after a significant exposure, compliance improved. Simplifying this process by bringing point-of-care screening to exposed employees assisted in meeting the needs of the staff and not only improve compliance, but decrease the time-to-treat.

Point-of-care testing has been studied in several different settings. Singer, Ardise, Gulla and Cangro (2014), trialed point-of-care testing in the emergency room for patients with chest pain to improve turnaround time and facilitate treatment. As discussed by Singer et al., (2014), the results clearly demonstrate that the test turnaround times and ED length of stay was significantly reduced by having the ED nurses perform bedside point-of-care testing. This change enhanced efficiency by reducing turnaround time in the ED and improved the bedside nurse's participation in care.

Laurence et al., (2009), conducted a trial regarding patient satisfaction with point-of-care testing and the trial indicated that patients thought having immediate feedback was important and motivated them to look after their condition. Point-of-care screening can positively influence patient outcomes by not only making it more convenient for the patient, but encouraging greater involvement of patients in the plan of care.

Another area where point-of-care was studied was in general practice. Gialamas, et al., (2009), conducted a clinical trial and determined that because point-of-care testing offers providers instant test results, it removes a barrier to adherence by enabling treatment in a single visit. Additionally, Gialamas et al., (2009), noted that point-of-care testing was very useful to providers because they can make immediate decisions based on the results and discuss the results / plan of care with the patient in a timelier manner.

Although the setting where point-of-care testing was implemented in these studies was in the ED (Singer et al, 2014) and general practice (Gialamas et al, 2009), it was reasoned that point-of-care screening could be applied to employee health context. If barriers could be removed, it was anticipated that the time-to-treat and compliance would improve.

Critical Appraisal

The level of evidence used in this project included six articles. Of these six articles three were randomized controlled trials, two articles were expert opinions and the last article was a case

controlled study. These articles provided sufficient evidence for implementing the pilot project. Table 3 summarizes this analysis.

Table 3.

Synthesis Table of Select Articles

	Bender	Dulmen	Renaud	Singer	Laurence	Gialamas
Independent Variable (Intervention)						
Barrier Removal	X	X				X
Point-of-Care Location			X	X	X	
Dependent Variable (Outcomes)						
Adherence	↑	↑				↑
Time-to-Treat			↑	↑		
Patient Satisfaction					↑	
LEVEL OF EVIDENCE (LOE)						
LOE 1						
LOE 2			X		X	X
LOE 3						
LOE 4				X		
LOE 5						
LOE 6						
LOE 7	X	X				

Presentation of Theoretical Basis

As described by Burns (2004), Lewin's 3 step model of Unfreezing, Changing and Refreezing (see Appendix B) was utilized for this project. Because post-exposure management process had not changed in quite some time, the system was "frozen" until the data (Table 2) came to light. Once this data was analyzed and shared, it became apparent that a change was needed ("unfreezing"). By unfreezing or changing old behavior, the mindset around post-exposure management was disrupted. Identifying a new process that incorporated feedback from stakeholders facilitated the change process to create a "new normal" ("refreezing").

As part of this pilot, it was also of utmost importance that the Medical Center comply with federal, state and regulatory agencies. The U.S. Department of Labor, Occupational Safety and Health Administration (**OSHA;** 2011), has promulgated several regulations designed to protect workers from acquiring an infectious disease in the workplace. The Personal Protective Equipment Standard (29 CFR 1910.132) most commonly known as Standard Precautions and the Respiratory Protection Standard (29 CFR 1910.134) and includes OSHA's TB compliance directives. These standards list employer responsibilities for protecting workers, reporting and recording occupational illnesses.

The Ohio Department of Health, (2016) also has requirements to report infectious diseases so that the population is protected from exposure events. Meningitis and TB are classified as reportable diseases in Ohio. The Ohio Administrative Code Chapter 3701-3, classifies Meningococcal Disease as a Class A reportable disease--a major public health concern because of the severity of disease and potential for epidemic spread. Tuberculosis and Varicella are classified as Class B diseases with a potential to cause epidemic exposures. For Tuberculosis hospitals and other healthcare facilities are required to:

- Provide counseling and screening of healthcare workers for latent and active TB infection
- Promptly evaluate possible episodes of TB transmission
- Report any clusters or cases that are epidemiologically linked
- Implement practice guidelines for reporting and management of exposures

Another regulatory agency, Joint Commission (JC), has established standards designed to protect the healthcare worker from infectious disease and specifies responsibilities for prevention and post exposure management. According to the Joint Commission, (2016), standard IC.02.03.01 and elements of performance 1-4 require that the hospital works to prevent the transmission of infectious

disease among patients, licensed independent practitioners, and staff. The standards include, but are not limited to the following:

- Screening of staff for exposures to infectious disease (e.g., TB, Meningitis, Varicella)
- Ensuring/evaluating staff immunity (Varicella)
- Providing assessments, tests, prophylaxis, immunizations, treatments and/or counseling to staff who are occupationally exposed to an infectious disease

At this Medical Center, policies and procedures for managing employee exposures are based upon federal and state regulations, and JC standards. This was an important step to review during the unfreezing stage of The Lewin Model used for this pilot project. All of the regulations and factors described motivated change and helped improve outcomes. Another key element of the "refreezing" process will be continued communication with the stakeholders regarding compliance rates to monitor how the new screening process is working.

The evidence-based practice (EBP) model that was used is Rosswurm and Larrabee's Model for evidence-based practice change (2009). The model provided a sound structure for this project to conduct a practice change that impacted several different areas while also integrating principles of quality improvement (QI), use of team work tools, and evidence-based translation strategies to promote adoption of a new practice (Melnyk & Fineout-Overholt, 2011). The principles described were instrumental in changing the current post exposure protocol. The following six steps outlined by Melnyk and Fineout-Overholt (2011) were followed in the design, implementation and evaluation of this project:

1. Assess the need for change in practice
2. Locate the best evidence
3. Critically analyze the evidence
4. Design practice change

5. Implement and evaluate change in practice

6. Integrate and maintain change in practice

Examples of each of these steps are included in the sections that follow.

Utility / Feasibility

Because staff was treated post-exposure in a timelier manner and compliance with screening and treatment improved, the Medical Center is committed to this project. Employee Health had adequate staff to implement this project and they have already agreed to adjust their time during an exposure to accommodate all three shifts. Lastly, a portion of this project focused on finding the needed space on the various units for staff to be screened and treated. The difference in workflow is described in (Appendix C). There was no foreseeable risk in implementing this project. The project was simply a change of location and hours to improve convenience for exposed employees.

The Employee Health staff had been made aware of this proposed change and contributed to planning discussions. Current screening protocols and procedures were reviewed and determined to be accurate and up-to-date. Supplies needed for establishing on-site post exposure management clinic by event type were outlined and prepared in (Appendix D).The pilot project plan was reviewed by the Medical Director, Employee Health Manager and myself (as administrator of Employee Health).

Recommendation / Organization Readiness for Change Summary

The key stakeholders that were identified included: Clinical Epidemiology, Employee Health, Nursing Director of Critical Care, Respiratory, Housekeeping, Administration and the Quality Department. I met with leaders of the various departments to discuss this project and obtained feedback prior to implementation. All stakeholders were in support of the project.

In addition, this pilot project was approved in concept through the pharmacy and therapeutics sub-committee (P&T). Review and approval by the organization's Infection Prevention Committee

was approved in January, 2017. This pilot project was also reviewed and approved by the College of Nursing/Medical Center's Feasibility Review Committee in January, 2017.

After the pilot project was implemented, I met with stakeholders to discuss the evaluation data. We discussed how this plan was implemented and what practical steps were necessary to make it successful. The stakeholder group will continued to monitor evaluation data for continuous improvement. As the processes of this pilot project are implemented in future exposures, the Employee Health staff will work closely with the various Nursing Directors to work out logistics such as determining the proximal space for screenings.

Section Three: Methods

The most important concept gleaned from the literature search was removing barriers and making it more convenient for employees to be screened and treated after an exposure event. This project was designed to improve time-to-treat and compliance rates. Having the Employee Health nurses conduct the screening on-site removed a current technical barrier presented by staff having to leave the work area and report to a remotely located Employee Health unit for screening. Past data (see Table 2.) clearly shows that compliance rates related to three select diseases needed to be addressed.

Plan for Implementation of the EBP Practice Change

The Rosswurm and Larrabee's Model for evidence-based practice change (2009) was utilized for implementation of the project. This model was selected because it fully supports a team approach to practice changes because it provides six clear steps to promote adoption of a new practice (Melnyk & Fineout-Overholt, 2011).

Clinical Context

The site used for this project was a large Midwestern academic medical center. This particular organization has over 19,000 employees and the Employee Health Department is responsible for providing Employee Health services for all staff. Outbreak response is particularly important in settings that present the greatest risk for severe disease (e.g., healthcare settings) (Lopez, Schmid & Bialek, 2011). After a significant exposure such as Tuberculosis, Meningitis or Varicella, hospital staff members must be seen by Employee Health. Screening employees quickly can be challenging at times for the employee Health Department. During a past meningitis exposure in the previous practice , only 36% of 39 hospital meningococcal-exposed staff members were evaluated within 3 days (the standard timeframe protocol) after the exposure event, 18% were never seen at all. Informal feedback from several staff members revealed two significant barriers for employees: limited operational hours of Employee Health and the distance from Employee Health to the

employees' unit. In addition to these technical barriers, some staff members were non-responsive despite several contacts. This has greatly impacted compliance during an exposure event.

Potential Barriers and Facilitators

Four potential barriers were identified for this project:

A. Not having sufficient staff for a post-exposure event and delaying daily operations at the employee health department;

B. Widespread geographical area of an exposure;

C. Storage of Varicella vaccine (only if applicable;

D. Weekend Exposure.

A. Insufficient staff was addressed by utilizing the Employee Health internal resource pool (IRP) to help facilitate screening for this post-exposure event. These staff members are not full-time and work on an as-needed basis.

B. Exposure events may occur in a widespread geographic area. For example, an infectious patient may be seen in an ambulatory radiology department, a doctor's office in an ambulatory location, the Emergency Department, or one floor of a unit/building. As such, these exposures may happen in various parts of the city. For the exposure discussed in this paper, the Employee Health staff only had to travel to one area to conduct the screenings. This area was convenient for the majority of the staff who were exposed.

C. The Varicella vaccine requires storage in a medication grade freezer. There is a potential for an exposure to happen on a unit where a medication grade refrigerator is not available. In this case, storage of the Varicella vaccine was not a factor. This may present a challenge in future Varicella exposures. Plans for future exposures call for the Employee Health Manager to work with Unit Manager(s) to locate an appropriate refrigerator to store the Varicella vaccine as staff members are being screened and treated. This will occur before the Employee Health staff transports the vaccine.

D. If an exposure involves a significant amount of hospital staff members, providing screening after-hours or weekends to cover this number would have resulted in overtime hours for the Employee Health staff. The Employee Health nurses have committed to this process and they are willing to work after-hours or weekends to screen and treat employees. For this project, schedule changes were minimal and easily addressed.

Facilitators that assisted in implementing this practice change were the Employee Health manager, Clinical Epidemiology Department, the various Nursing Directors, administration, appropriate resources and budget. All of these facilitators were supportive of this pilot project in the beginning stages. Updates were provided to the various groups such as Infection Prevention Committee, and the Employee Health staff monthly meetings. These facilitators were able to provide feedback on what worked well and what needed to be improved.

Methods and Tools

Measures that were monitored included:

- Percentage of employees seen within the optimal time frame
- Percentage of employees seen outside of the optimal time frame window
- Percentage of employees never seen
- Cost and time savings
- Overall satisfaction score with point-of-care screening / treatment

Compliance information for this exposure was collected by the Employee Health Manager. Collection of this data was instrumental in determining whether this pilot project helped with time-to-treat and compliance rates. A standard questionnaire was given to each health care worker to evaluate the new process. The survey (Appendix E) was given to the exposed staff immediately following the screening process. The employees were provided with the survey and the results were

placed in a sealed envelope. The length of time to complete the survey was less than two minutes. Data was collected by the Employee Health Manager and Employee Health staff.

T-tests were used to identify statistically significant differences of the pilot group to the mean of all of the exposures for time-to treat outside the prescribed timeframe and for those who were never screened/treated (compliance rates). The participants' responses to each question on the questionnaire were recorded electronically and a summary was created for review. Quantitative survey data was recorded in an Excel workbook for data analysis for transfer to SPSS. A qualitative analysis was included to identify themes from the open-ended questions.

Feasibility of this project included approval from the College of Nursing/Medical Center Feasibility Review Committee and the Nursing Union to grant permission to survey union members. Also, hospital administration approved the questionnaire before administering. Technical issues were considered, such as the survey system and staff's ability to have time to complete the survey after the screening process.

Practice Model Use

The Rosswurm and Larrabee model as described by Melnyk and Fineout-Overholt (2011) was utilized to guide the evidence-based process for this project. It is defined in the following steps:

Step One: Assess the need for change in practice.

This project was developed due to low compliance rates and hospital staff members being screened outside of the optimal timeframe after an exposure. With the current screening process, there was a great deal of frustration from hospital staff members, providers and Employee Health. The Employee Health staff met together as a team to discuss how this process could be improved. During this process, they were also able to obtain feedback from other areas, such as Clinical Epidemiology and various nursing units, on how to enhance this process.

Step Two: Locate the best evidence.

In searching for the best evidence, a PICOT was developed to help guide the search. “In hospital staff members (**P**opulation) who have been exposed to select virulent infectious diseases, does on-site screening and treatment (**I**ntervention) vs. centralized screening and treatment (**C**omparison) impact time-to-treat and compliance within the appropriate time frame (**T**ime)”. There were 1,313 articles retrieved, 75 articles reviewed and 6 articles critically appraised.

Step Three: Critically analyze the evidence.

Evaluation (Appendix A) and Synthesis (Table 3) tables (see Table 3 and Appendix A) were created after the literature search to summarize the evidence. This information was shared and reviewed with the Employee Health Manager and Medical Director.

Step Four: Design practice change.

After synthesizing the evidence, a proposed practice change was developed and ultimately agreed upon by both the Employee Health Department and management. A point-of-care service pilot project was then developed to remove barriers and improve compliance rates.

Step Five: Implement and evaluate change in practice.

Final approvals were in place and this pilot project was implemented. Approvals from DNP the student’s committee and Feasibility Review Committee have already been granted. Additionally, after implementation, outcomes and conclusions continued to be reviewed with key stakeholders. The feedback was used to make adjustments and helped determine that this new practice would be adopted.

Step Six: Integrate and maintain change in practice.

This new practice was adopted and key points monitored were time-to-treat compliance rates and staff satisfaction. Results were shared with administrative leaders who had the authority to make this change a standard of care.

Budget and Resources

Additional resources needed for this pilot were minimal. Currently, Employee Health performs post-exposure treatment within their department; therefore supplies and staffing to carry out the screenings were already budgeted for. Administration supported the use of additional funds needed to cover extra hours due to screening needs. If a future exposure involves a significant amount of hospital staff members, overtime may be necessary. For this pilot, the Employee Health nurses committed were willing to work after-hours or on weekends to screen and treat employees, but this was not necessary.

Both the management and staff of the Employee Health department were involved in developing this screening process. The new process was approved and implementation and Employee Health staff were prepared. The College of Nursing provided a statistician to assist with the data analysis after the new process was implemented.

The main deficiency that needed to be addressed was in finding a private and secure area on the unit to conduct the screening. Fortunately, for this particular exposure, space was not an issue. Time savings resulting from on-site screening were calculated for the project. Table 4 displays the potential savings if this project had been in place for 2016 exposure events.

Travel time and wait time are decreased when Employee Health staff screen and treat employees on the unit. Due to the range of employees who are screened during an exposure, the Medical Center's average employee rate of $30/hour was used to calculate the projected savings. This is an additional downstream benefit of implementing this pilot project.

Table 4.

Cost & Time Savings with Proposed Innovation

Exposure	Time reduction Current to Projected	# of exposed HCWs (2016)	Current Cost[7]	Projected Cost[7]	Savings[8]
TB exposure	65 min[1] to 20 min[2]	51	$1657	$510	$1147
Meningitis	65 min[3] to 15 min[4]	110	$3576	$825	$2751
Varicella	60 min[5] to 15 min[6]	109	$3270	$817	$2453
Total:		**270**	**$7866**	**$2024**	**$6351**

[1] 10 min walk (2) + 10 min wait + 10 min for first visit + 10 min walk (2) + 5 min for wait and reading , 2nd visit = 65 min
[2] 5 min wait + 10 min visit for first visit + 5 min wait and reading for 2nd visit = 20 min
[3] 10 min walk (2) + 30 min wait + 15 min visit (wait time is longer due to the number of people arriving together) = 65 min
[4] 5 min wait + 10 min visit (staff able to monitor wait times and arrive when wait times are shorter) = 15 min
[5]10 min walk (2) +10 min wait + 5 min record review + 10 min vaccination + 15 wait for monitoring after live vaccine = 60 min
[6] 5 min wait + 10 min vaccination (record review before staff arrival; no monitoring required due to return to patient care environment)
[7] # people X Time = Total Minutes (TMIN). TMIN / 60 X $30.00 = Cost
[8] Current Cost – Projected Cost = Saving

Section Four: Findings

The problem addressed by this project was how to improve time-to-treat and compliance for employees exposed to an infectious disease. Historically, post-exposure compliance rates were low and many healthcare workers were screened beyond the optimal time frame or not at all. This drove the project's focus to on-site screening.

An opportunity to implement on-site screening presented itself on February 23rd, 2017. A male patient was admitted to the medical center for a gunshot wound to the chest. This patient was admitted through the Emergency Department (ED). After he was stabilized, he was taken to the Operating Room (OR) and then transferred to the Surgical Intensive Care Unit (SICU). On February 26th, 2017, specimens were collected from a Broncho Alveolar Lavage (BAL). Antibiotics were started for the suspected infection. On the evening of March 1st, laboratory tests confirmed Neisseria Meningitidis[1]. The next day, March 2nd, 2017, the Clinical Epidemiology Department issued an exposure notification memo to the ED, OR, SICU, Anesthesia Department and Respiratory Therapy Department. Because Neisseria Meningitidis requires droplet isolation, all employees who had contact with the patient's respiratory secretions from February 23rd through February 27th needed to be identified by the appropriate manager and consequently screened by the Employee Health Department. Once identified, employees were personally evaluated to determine if they provided care to this patient prior to initiation of precautions (between admission on 2/23/17 through 2/27/17 at 12:30 PM) and if they met any of the following screening criteria:

- Working with laboratory specimens on meningococcal isolate outside of a biosafety cabinet and without the use of splash guards or other forms of protection from droplets
- Performed or assisted with open suction
- Performed or assisted with extubation

[1] Neisseria Meningitidis is a gram negative bacterium that leads to meningitis. Neisseria Meningitidis will be referenced as Meningitis moving forward throughout this document.

- Performed or assisted with suctioning of a tracheostomy
- Performed or assisted with disconnecting or reconnecting ventilator tubing
- Had direct contact with the patient while the patient was actively coughing
- Performed mouth-to-mouth resuscitation
- Performed or assisted with intubation
- Performed or assisted with open manipulation of a tracheostomy
- Performed or assisted with cleaning a tracheostomy
- Performed or assisted with a sputum induction
- Had direct contact with the patient while the patient's respiratory secretions were aerosolized
- Provided direct patient care during time that patient pulled out Dobhoff (nasogastric feeding tube) on 2/26/17

The Employee Health Department worked closely with Clinical Epidemiology to communicate with units where the significant exposure occurred. The Employee Health staff was quickly assembled to develop screening days and times for this exposure, as well as securing a location within proximity of the majority of exposed staff. The Employee Health staff went to the location to prepare for the screening as the managers began to create their lists of affected staff members. Six on-site screening clinics were scheduled over four days and at various times to serve different shifts.

The following measures were used to evaluate the effect of the project on key project outcome indicators:

- Percentage of employees seen within the optimal time frame
- Percentage of employees seen beyond the optimal time frame
- Percentage of employees never seen
- Costs and time savings from an exposure
- Overall satisfaction score with point-of-care screening / treatment

Table 5 displays the data collected regarding each indicator during this exposure versus the data collected for all meningitis exposures in 2016. As shown in Table 5, implementing on-site screening improved the overall compliance of health care workers seen within the optimal time frame. The percentage of health care workers who were never screened decreased dramatically from 53% to 2%. A delay in initially identifying the presence of the disease is the reason the number of health care workers seen within the three day time frame decreased (32% in 2016 compared to 17% in 2017). The patient was not officially diagnosed with meningitis until March 1st; however the exposure time frame was from February 23rd to February 27th. Antibiotics were initiated for the patient on February 26th. After receiving twenty-four hours of antibiotic therapy the patient is considered no longer infectious. The period of communicability for meningitis is defined as the time during which an infectious agent may be transferred from an infected person to another person and continues until live meningococci are no longer present in discharges from the nose and mouth; typically within 24 hours after institution of appropriate antimicrobial treatment (Heymann, 2008).

Despite the late identification, 94% of health care workers on the exposure list were seen within three days of identification. Excluding the delayed diagnosis time period, this pilot project improved the number of health care workers seen in the first three days of notification. Lastly, thirty-two of the eighty-nine healthcare workers on the exposure lists received the post-exposure prophylaxis antibiotic (Cipro).

The final row of Table 5 summarizes data from health care workers who were not on the exposure list but who presented for screening representing 16.8% (n = 18) of the total employees who were screened. Because of point-of-care screening, they were made aware of a potential exposure through word-of-mouth from colleagues and chose to self-identify as being at-risk. Post-exposure prophylaxis was recommended for thirty-two of the eighty-nine (36%) of workers on the exposure list and ten of the eighteen (55.6%) of those who self-identified.

Table 5.

Time-to-Treat and Compliance

	# of exposure events	# of HCWs reported on exposure list	# of HCWs seen within optimal time frame (within 3 days)	# of HCWs seen within 3 days of exposure notification or self-identification	# of HCWs seen beyond the optimal timeframe, but within the 10 day incubation period	# of people never screened	# HCWs receiving *PEP
2016 Neisseria meningitis exposures	4	110	35 (32%)	Not available	17 (15%)	58 (53%)	30
2017 Neisseria meningitis exposures	1	89	15 (17%)	84 (94%)	72 (81%)	2 (2%)	32
	Self-reported, same incident	18	0 (0%)	18 (100%)	18 (100%)	N/A	10
*Post-Exposure Prophylaxis (in this case, Cipro)							

These results indicate that the implementation of the point-of-care screening was effective at identifying additional workers who were not identified using the exposure list alone and that many of those identified using the point-of-care screening had a significant exposure.

Cost and time savings were additional indicators evaluated from this pilot project. Table 6 displays the cost and time savings from this project. This table compares the projected cost versus the estimated actual cost of decentralization. This project greatly reduced the employee wait time from previous exposures because hospital staff members did not have to travel to Employee Health and wait to be seen. Additionally, the actual cost savings ($3,150) was significant to the organization as compared to previous meningitis exposures. The cost of Cipro is nominal, less than $1.00 per dose.

Based upon an average of 340 HCWs exposed per year, cost savings per year are estimated to be $10,200 per year for the 3 infectious diseases. Five year savings are estimated to be $51,000. In addition, results of the pilot project showed that 10 of the 18 self-identified people had significant

exposures to

Table 6.

Estimated Cost of Pre Project vs. Post Project

2016 Exposure	Time reduction Current to Projected	# of exposed HCWs	Current Cost[1]	Projected Cost[1]	Savings[2]
Meningitis	65 min[3] to 15 min[4]	110	$3576	$825	$2751
2017 Exposure	Time reduction Current to Actual	# of exposed HCWs	Current Cost[1]	Actual Cost[1]	Savings[2]
Meningitis	65 min[3] to 5 min[4]	105	$3,412	$262	$3,150

[1]# people X Time = Total Minutes (TMIN). TMIN / 60 X $30.00 = Cost
[2] Current Cost – Actual Cost = Saving
[3] 10 min walk (2) + 30 min wait + 15 min visit (wait time is longer due to the number of people arriving together) = 65 min
[4] 5 min (time of visit; measured from arrival to departure; includes ID confirmation, screening, medication administration if indicated)

Meningitis. Although the risk is assumed to be low, had these people not obtained prophylaxis, the risk to the HCW and the facility is great if the exposure results in disease.

Finally, employee satisfaction with this new process was evaluated. After the screening process was complete, screened employees were asked to complete a survey (Appendix E). The survey consisted of five questions, with the last question giving the staff the opportunity to provide open-ended feedback. The rating scale was zero to one hundred, with zero meaning “not convenient” to fifty “meaning somewhat convenient” to one hundred meaning “very convenient”. The five questions were:

1. How convenient was it to have the EHS nurse on your unit to conduct the screening?
2. How convenient was the time for you to be seen?
3. How would you rate the service you received from the EHS staff after your exposure event?

4. How well did the nurse answer your questions?
5. Is there anything we could have done better to improve your visit for post exposure management?

Seventy eight employees out of one hundred and five employees who were screened completed the survey (74% response rate).

Table 7, shown below, displays the mean and median value of each question. As shown in Table 7, there was a high level of satisfaction from this pilot project in all areas mentioned. Employees indicated in the open-ended question that they were very satisfied with this new process and they felt it was very convenient for them to be screened. The Employee Health staff received written feedback such as: “everything was perfect and convenient”, “very easy to stop for screening” and “everything seemed very forward and helpful”. Two ED staff members indicated that the location was not ideal for them.

Table 7.

Distribution of survey responses by question

	N	*Mean*	*STD*	*Median*	*Minimum*	*Maximum*
Question						
1	78	95.8	16.4	100	0	100
2	78	93.2	21.7	100	0	100
3	78	99.1	3.7	100	80	100
4	78	99.1	4.0	100	80	100

Table 8 displays both the historical and observed rates for each outcome. The FREQ procedure in SAS (version 9.3) was used to test whether the observed rate was different from the historical rate. For both outcomes the p value was less than 0.05, indicating that the proportions with the on-site screening were different from the historical levels. This information clearly shows a

statistical difference for both outcomes. Additionally, for both outcomes, this table demonstrates that there is evidence that this intervention has resulted in a positive change in the compliance rates.

Table 8.

Comparison of Proportion Screened/Never Seen

Outcome	*Historical rate*	*Observed rate with new protocol*	*p Value*	*95% Confidence interval for the true rate*
Proportion screened within 10 days	0.15	0.81	<0.0001	0.71 to 0.88
Proportion never seen	0.53	0.02	<0.0001	0.003 to 0.079

Discussions / Conclusions

Historically (see Table 2), the majority of employees who have been exposed to infectious diseases were either not screened in a timely manner or were not seen at all. The main focus of this pilot project was to implement a point-of-service screening approach to improve two key outcomes: the proportion of employees seen within 10 days of the event, and the proportion of employees who were never seen. Historical levels of each outcome were available to compare to those observed with the on-site screening.

Overall this intervention was successful because it was received positively by staff and it accomplished the goals that were established. The Employee Health staff screened physicians, residents, anesthesiologists, nurses, respiratory therapists, nurses' aides, sitters and housekeeping staff. For each staff member, the process took less than 4 minutes; including the time it took for employees to complete the satisfaction survey. The vast majority of staff were appreciative that the Employee Health staff came to their department. One of the anesthesiologists shared relief for not having to leave his assigned area, noting that time constraints would have made it difficult otherwise.

Limitations

Although the project successfully reduced the time- to- treat and overall compliance with screening, some systems issues were not addressed by this project. One limitation that was not addressed in this project is the manual identification of exposed employees. Creating this list is labor intensive and takes a great deal of time to complete. The Employee Health staff must rely on managers to generate an accurate list in a timely manner. Another area of concern is about those employees who were never notified of the exposure but who self-identified for screening. Without implementation of on-site screening, the active word-of-mouth activity would not have occurred and these employees would not have been screened and treated. Automated identification would address this issue.

Some of the barriers that were anticipated for this exposure did not occur during this intervention. One concern was about finding space to conduct the screenings. The desired area would ideally be in close proximity to the exposed unit and provide privacy to maintain confidentiality. For this particular exposure, space was not an issue and the Employee Health Manager was able to secure two conference rooms in the immediate area.

Another concern was regarding sufficient Employee Health staffing and finding mutually convenient times to screen staff. Most of the screening hours took place during Employee Health's normal working hours, which was ideal, and resulted in minimal hours of overtime. The Employee Health Manager and the Medical Director were available during this entire process to follow up with affected units to ensure their staff was reporting for screening.

Dissemination of Results

Project results will be disseminated internally to both hospital Infection Prevention Committees for this Medical Center. They track all exposure events and assist with advocating for additional resources in the future. The project results will also be shared at the Nurse Executive Council, which is a gathering of Chief Nursing Officers and various nursing leaders throughout the Medical Center. This is to inform them about the screening and treatment of their staff. External

dissemination activities include presenting this project at OSU's College of Nursing during a public oral defense. Following that, a poster will be presented at The Midwest Nursing Research Society in April of 2017. This conference provides opportunities for students to learn about innovative research projects, new scientific methods and enables them to have thoughtful discussions with other nursing students throughout the country. After defending this project, I plan to submit an article describing the project in "Worldviews on Evidence-Based Nursing", a peer-reviewed journal.

Section Five: Recommendations and Implications for Practice Project Summary

Changing the process from a centralized location to an on-site location was successful for this project. One hundred and five health care workers were screened and 95% of those workers were seen within three days of proper identification of the disease. Of the forty-two health care workers who were identified as needing post-exposure prophylaxis, 100% of them received the post-exposure prophylaxis within the ten day incubation period. Screened employees provided very positive feedback about this new process.

This change was also positive for operations within the Employee Health Department itself. Office staff noticed a marked improvement in their day-to-day operations in the Employee Health Department while screening for exposure was taking place in the remote location. Previous exposures have caused crowded office space and extended wait times for workers who required screening. Because of this change there were normal wait times in the department and staff did not feel the usual pressure of having to rush through their day as when past exposures were seen in the office.

The staff who conducted the screenings enjoyed the autonomy of being on the unit and the time they had to educate the employees on meningitis exposure. They felt they were prepared from the planning meetings and felt confident about the new process.

Recommendations

In completing this pilot project, it is clear that the following action steps should occur before the next exposure:

a. There needs to be system-wide education on when and how to wear proper protective equipment for patients. In some cases that were identified during this pilot, the need for prophylaxis was due to staff not wearing the proper protective equipment.
b. The Employee Health Department will need to work with various departments to ensure the proper equipment is available at all times and that staff is educated on its location.

During the screening process, some staff reported not knowing where the protective equipment was stored.

c. Collaboration with Information Technology Department to automate how exposed staff are identified. This will address the cumbersome and relatively slow manual process used to generate the exposure list.

Implications for Practice

DNP Essentials I, II, III, V, and VIII (AACN, 2006) were addressed during this project.

Essential I, scientific underpinnings for practice, emphasizes that the DNP graduate should be able to incorporate evidence-based concepts and science into current practice to improve outcomes. As the literature search progressed, the evidence suggested that removing barriers and providing point-of-care service screening would address time-to-treat and compliance concerns. As project leader, I collaborated with many leaders from the Medical Center's Clinical Epidemiology, Infection Prevention and Employee Health to discuss the issue and the proposed approach to post-exposure screening and treatment. As a result of sharing our current compliance rates, I was able to mobilize resources and gain support for this project. Consequently, this project played an important role in improving the quality of care provided to health care workers who are exposed to infectious diseases.

Essential II speaks to the organizational and systems leadership required for the DNP graduate to improve patient and healthcare outcomes (AACN, 2006). Additionally, Essential II requires the DNP graduate to have the knowledge and ability to make quality improvement changes on a system level. The change that was implemented by my project directly relates to Essential II because it is an evidenced based quality improvement project (AACN, 2006). I was able to identify a system issue and facilitate a system-wide change in the way post-exposure management is delivered. This change improved overall compliance rates and provided a time and cost savings to the

organization because employees no longer had to report to Employee Health or endure long wait times to be screened.

Essential III emphasizes the use of analytic methods to critically appraise existing literature and other evidence to determine and implement best practices (AACN, 2006). An extensive literature search continued to refine my thinking about the project and definition of the actual problem which was to improve time-to-treat and compliance with screening and treatment protocols. The critical appraisal of the evidence identified gaps in the current approach to post-exposure management, which led to the needed practice change. Another key aspect of Essential III (AACN, 2006) that was illustrated in this project was the importance of sharing data with key stakeholders and proposing a viable way to address issues of concern. The need to improve compliance rates was crucial to gaining support for this project and future investments. This essential highlights the DNP student's ability to communicate with others and work with interdisciplinary teams. This project took a great deal of planning with various departments and engaging multiple stakeholders to implement this change. I continuously spoke with managers, leaders, health care workers and providers who were involved in past exposures to gain a better understanding of the pressing issues and how to resolve them. These interactions proved to be paramount in determining the necessary steps to move forward with the project.

Although Essential IV did not play a major role in this project, it will be important to leverage the use of technology in exposures moving forward (AACN, 2006). The increased compliance rates as well as the delayed identification of exposed employees helped illustrate the need for automation of this process in the future.

Health care policy (Essential V, AACN 2006) was also important to this project. It is crucial to have an understanding of the rules and regulations around health care workers' rights and safety. This project had to be aligned with federal and state regulations. It is important for the organization to have the necessary policies in place to protect their staff. This project falls in line with the

standards for Joint Commission standards and The Ohio Department of Health. As mentioned earlier, healthcare organizations are required to screen their employees if there is an exposure and provide treatment in a timely manner. This project is designed to meet both of those objectives.

Finally, Essential VIII speaks to increased knowledge and foundational practice competencies (AACN, 2006). As a result of this project, I developed an increased knowledge and competency around post-exposure management. I was able to evaluate our screening procedures on a systems level and research the evidence for best practices. I worked closely with the Employee Health staff to learn more about our current practices and how we can change our approach to improve screening procedures. Together we were able to implement a change on a systems level based on evidence, regulatory bodies and current compliance rates. This change will have an expected sustainable impact on the overall hospital compliance rates. Administration, Employee Health and Clinical Epidemiology all showed satisfaction with this project and offered support of organization-wide implementation. Due to the success of this project, post-exposure management will be conducted as outlined in this project for any future exposures.

Project Site

This project was conducted at the Medical Center in the Surgical Intensive Care Unit. This type of exposure does not typically happen in this area. This is significant because the Surgical Intensive Care Unit has not had an exposure in over two years and staff were not familiar with post-exposure protocols. As a result of on-site screening, time-to-treat and compliance were greatly improved. This success lends support to using this project's approach in future exposures to provide better support for the employees.

Future Possibilities

This project will be implemented throughout the medical center moving forward. As demonstrated by this project, the Employee Health Department is able to mobilize quickly to set up a clinic in the exposed area. In addition, this project could potentially lead to an expansion of the

department. Perhaps there could be a request to have several satellite clinics within the medical center. This would allow employees to remain in the building and go to these satellite clinics for routine care.

This pilot project was an invaluable learning experience. I learned a great deal about our organization and how so many people are impacted from this process. Additionally, I gained firsthand experience on how stressful an exposure can be to an employee. This process was able to directly impact their personal lives because we were able to ease their concerns about how their health was affected and provide the necessary treatment. I was fortunate to work with multiple leaders, managers and staff throughout the organization. It was exciting to watch the process unfold from beginning to end. So many people were grateful for this new process and it was a needed change that was felt right away.

Healthcare is an industry that is constantly adapting to meet the needs of staff and patients alike. It is crucial for the success of any organization that improvements are implemented whenever possible. This project is an exemplar of how communication and cooperation between departments can positively influence the health and well-being of staff. Employee safety is a foundation of any successful organization and I believe this project will have a profound impact on this medical center.

As the administrator of this department, it was immensely satisfying to recognize a significant problem and develop a solid plan to address it. Time-to-treat and compliances rates showed improvement because this project was able to address an intractable problem. As a result of a team approach by multiple departments and leaders, we were able to create an evidence-based protocol to substantially improve the health and safety of our employees and patients.

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Appendix A

Evaluation of Literature Table

PICOT Question: In hospital staff members who have been exposed to select virulent infectious diseases, does on-site screening and treatment vs. centralized screening and treatment impact time-to-treat and compliance within the appropriate time frame.

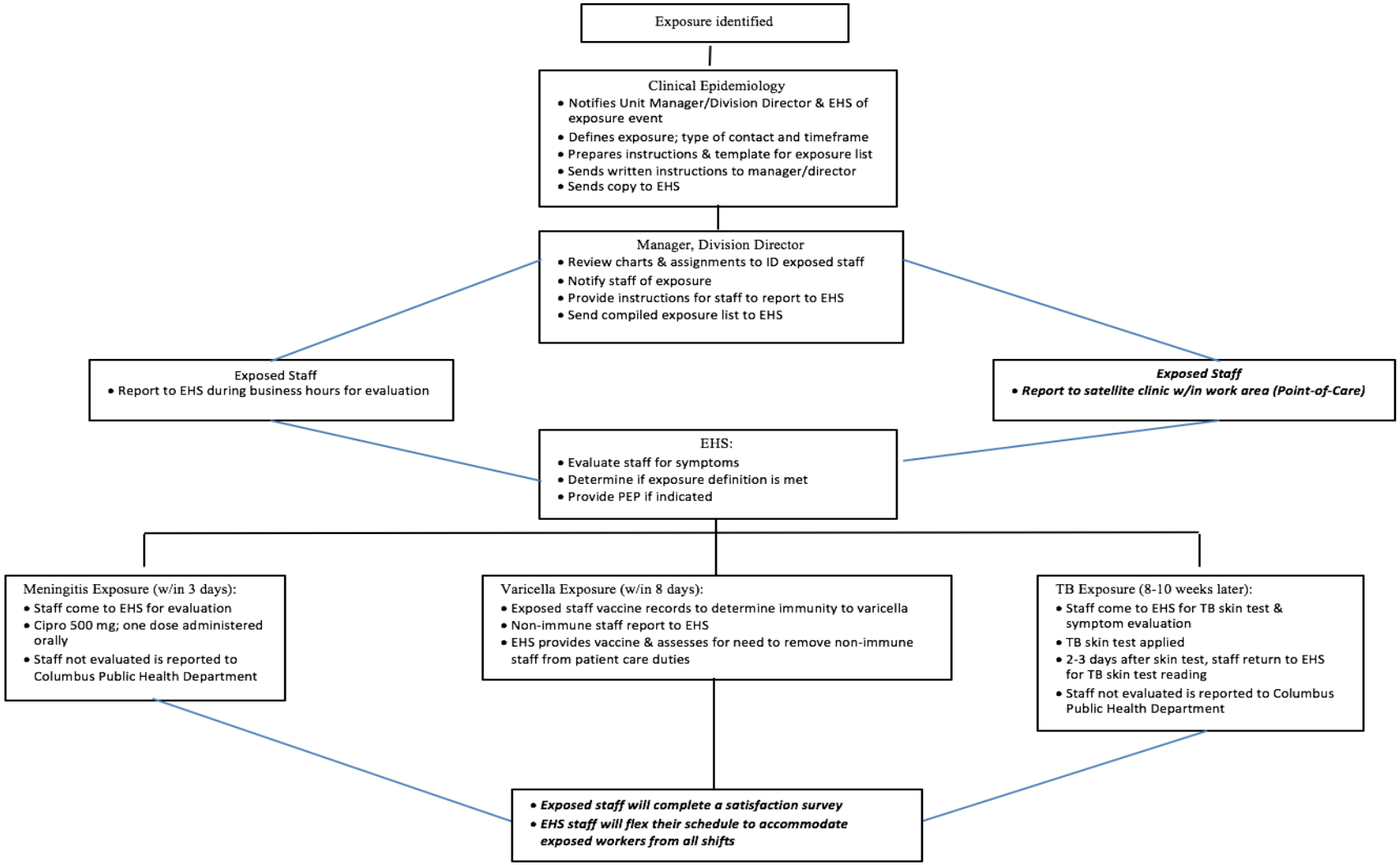
Citation	Design / Method	Sample / Setting	Major Variables	Measurements	Data Analysis	Conclusions/Findings	Level of Evidence	Appraisal: Feasibility of implementing the evidence
Bender, Milgrom & Apter, 2003	Review of literature without statistical analysis	N = 16 published reports were identified	DV: Adherence to treatment: IV N/A	Not applicable	Not applicable	New strategies for improving adherence must start with efforts to identify root causes. Remove barriers to improve service by eliminating distractions, making the process easier and improving communication	VII	**Strengths:** There was a good sample size to review patients adherence with a chronic disease. Half of the studies reviewed found the experimental intervention did change adherence, and behavior change reported by patients was not accompanied by changes in treatment success. **Limitations: N**eed more studies on how to reach non-compliant staff. This measurement of adherence was
Dulmen, Sluijs, Dijk, Ridder, Heerdink & Bensing, 2007	Review of systematic reviews of the effectiveness of adherence interventions	N = 38 articles	DV: Adherence to treatment: IV N/A	Not applicable	38 articles reviewed of 1,373 primary studies	Four types of effective adherence interventions: technical, behavioral, educational and multi-faceted or complex interventions.	VII	**Strengths:** This study explored different types of adherence interventions and their theoretical perspectives. Some of the findings are key in incorporating new ideas or changes. Limitations: No statistical difference between the interventions. **Risk or harm if implemented: N**one. **Feasibility of use in my project:** The most
Renaud, Maison, Ngako, Cunin, Santin, Herve, Salloum, Calmettes, Boraud, Lemiale, Grego, Debacker & Hemery, 2008	Randomized clinical trial	N=113. Study completed in the emergency department, with patients suspected with non-ST segment elevation and acute coronary syndrome.	DV: Time to treatment: IV POCT	Emergency physicians collected data through standardized patient interviews and medical records review during the ED evaluation Data included: Demographic data, clinical data,	Time to anti-ischemic therapy was measured between the POCT group and the central hospital laboratory group. Comparisons were performed using t-tests for continuous variables and chi-square for categorical variables	Point of care testing decreased the time to delivery of anti-ischemic therapy for ED patients with suspected acute coronary syndrome of about three-quarters of an hour, which was due to a shorter time to physician notification.	II	**Strengths:** POCT testing is useful in reducing time to treat. From this trial this was evident for ED patients with suspicion of non-ST segment elevation and acute coronary syndrome. **Limitations:** POCT on daily practice is poorly documented. In this study POCT only slightly reduced ED length of stay. **Risk or harm if implemented:** N/A **Feasibility of use in my project:** POCT will improve time to treat and compliance.
Singer, Ardise, Gulla & Cangro, 2005	Before and after trial. Two weeks with only central lab and two weeks with point of care testing	N= 366. POCT testing for patients with chest pain in the ED setting.	DV: Time to treatment: IV POCT	Data were analyzed using SPSS software. Contiguous variables are reported as means and 95% confidence intervals and categorical	Length of stay in the ED was shorter after introduction of POCT 5.2 hours versus 7.1 hours	Point of care testing by treating nurses reduces ED length of stay and test turnaround times. Test turnaround times for POCT was 14.8 minutes versus 83 minutes by central lab.	IV	**Strengths:** POCT testing improves time to treat. **Limitations:** study was not a randomized trial and study was limited to admitted patients. **Risk or harm if implemented: N/A Feasibility of use in my project:** POCT improved time to treat and improved efficiency of the nursing staff
Laurence, Gialamas, Buner, Yelland, Wilson, Ryan, & Beilby, 2009	Randomized controlled trial	N=4968 general practice patients 3010 Intervention 1958 Control group. Patients with diabetes, hyperlipidemia, and / or were on anticoagulant therapy.	DV: Patient Satisfaction IV: POCT	Satisfaction was measured at the end of the study for both groups using level of agreement with a variety of statements in a patient satisfaction questionnaire. A	Analysis was performed using a mixed model of variance (ANOVA) with allowance for clustering at the practice level following Box-Cox transformations	Response rate of 88%. Data showed high level of satisfaction with POCT. Intervention patients had higher levels of agreement than controlled patients with statements relating to their satisfaction with the collection process (P <0.001) and confidence in the process (P<0.001) and motivational in terms of better managing their condition	II	**Strengths:** Overall intervention patients reported higher level of satisfaction with POCT. The patients in the intervention group viewed POCT as strengthening their relationship with their GP. **Limitations:** Levels of satisfaction found in the intervention patients may result from being in the trial. **Risk or harm if implemented: N/A Feasibility of use in current project:** Improved patient satisfaction. Involving patients in care and providing services can positively influence health outcomes. In current project POCT will make it easier for staff to be seen on their unit.
Gialamas, Yelland, Ryan, Wilson, Laurence, Bubner, Tideman & Beilby, 2009	Randomized controlled trial	53 General Practice groups in urban and rural areas N = 4968 patients. Patients with established type 1 or type 2 diabetes, hyperlipidemia or requiring anticoagulant therapy.	DV: Adherence to medication IV: POCT	Medication adherence was measured using a validated scale, the five-item Medication Adherence Report (MARS-5) questionnaire	The proportion of MARS-5 questionnaire respondents who indicated that they adhered to medication was higher in the intervention group (39.3%) than the control group (37.0%). POCT was shown to be non-inferior to pathology laboratory testing for patients with diabetes (P=0.01) or hyperlipidemia (P<0.001) and for	Having access to POCT is associated with the same or better medication adherence compared with the lab	II	**Strengths:** Large sample size with many different chronic diseases. POCT provides providers with instant test results required for treatment and removes barrier to adherence because of a single visit. POCT also has the potential to increase compliance with disease management. **Risk or harm if implemented:** N/A **Limitations:** Self report is susceptible to overestimation of adherence. **Feasibility of use in my project:** POCT will be useful in providing timely care. POCT will help improve compliance and allow for hospital staff members to be screened in the appropriate time frame.

Legend Example: DV = Dependent Variable IV = Independent Variable POCT = Point of Care Testing N/A = Not Applicable

Appendix B.
Lewin's Model of Change (Burnes, 2004)

Appendix C

Post-Exposure Management (Current and *Proposed*)



Appendix D

Supplies for Post-Exposure Management

Meningitis Exposure	**Tuberculosis (TB) Exposure**	**Varicella Exposure**
Laptop (2)	Laptop (2)	Laptop
Duo device (for PeopleSoft) (2)	Duo device (for PeopleSoft) (2)	Duo device (for PeopleSoft) (1)
Cell or Cisco phone	Cell or Cisco phone	Cell or Cisco phone
Thermometer (2)	Tuberculin solution (5 bottles)	Varicella Vaccines (10)
Ciprofloxacin 500 mg tablets (50)	TB surveillance forms (50)	VIS statements
Screening questionnaire (50)	Pens (2 boxes)	Pens (1)
Stickers (50)	TB syringes (50)	5/8” 25g syringes (1 box)
Pens (2 boxes)	Alcohol pads (1 box)	Alcohol pads (1 box)
Small paper cups (50)	Non-sterile 2X2s (1 pack)	Non-sterile 2X2s (1 pack)
Bottled water (10)	Hand sanitizer (2)	Adhesive bandages
Hand sanitizer (2)	Gloves (1 box)	Hand sanitizer (1)
Plastic trash bags (2)	Plastic trash bags (2)	Gloves (1 box)
Cooler with ice	Sharps boxes (2)	Plastic trash bag (1)
	Cooler with ice packs	Sharps box (1)
		*site location must have a medication freezer available

Appendix E

Employee Satisfaction Survey Questionnaire

SURVEY INSTRUCTIONS:

You should only fill out the form if you are an OSUWMC employee who was evaluated by Employee Health Services for a work related exposure to an infectious patient. Answer all questions by completely filling in the circle using blue or black ink. Fill in the circle that corresponds with your rating. Example: ●

	Not at all convenient					Indifferent					Highly convenient
On a scale of 0-100, how convenient was it to have the employee health nurse on your unit to conduct the screening test?	O	O	O	O	O	O	O	O	O	O	O
	0	10	20	30	40	50	60	70	80	90	100

	Not at all convenient					Indifferent					Highly convenient
On a scale of 0-100, how convenient was the time for you to be seen?	O	O	O	O	O	O	O	O	O	O	O
	0	10	20	30	40	50	60	70	80	90	100

	Highly dissatisfied					Indifferent					Highly Satisfied
On a scale of 0-100, how would you rate the service you received from the employee health staff after your exposure event?	O	O	O	O	O	O	O	O	O	O	O
	0	10	20	30	40	50	60	70	80	90	100

	Highly dissatisfied					Indifferent					Highly Satisfied
On a scale of 0 to 100, how well did the nurse answer your questions?	O	O	O	O	O	O	O	O	O	O	O
	0	10	20	30	40	50	60	70	80	90	100

Is there anything we could have done better to improve your visit for post exposure management?